Abstract

Oxidative stress has been implicated in brain ageing and in age-related neurodegenerative disorders. Since N-acetylcysteine (NAC) has recently been shown to prevent oxidative damage in ageing brain, we have examined the effects of this thiolic antioxidant on the age associated oxidative stress related parameters in rat brain regions. The lipid peroxide formation, reduced glutathione (GSH) content along with the activities of superoxide dismutase (SOD) and catalase were determined in the cerebral cortex and cerebellum brain regions of the young (4 months) and older (14 months) female rats. The lipid peroxidation was observed to be increased in the cerebral cortex regions accompanied by simultaneous decrease in the GSH content in both the regions of older rats. The SOD activity was reduced in both the regions while catalase was reduced only in cerebellum region of the older rats. Following NAC supplementation (160 mg/kg. b. wt./ day), lipid peroxidation was observed to be reduced which was accompanied by enhanced GSH levels, along with enhanced SOD and catalase in both the brain regions of older rats. Further, in the younger rats the NAC treatment resulted in the decrease of lipid peroxidation in both the regions that was accompanied by the increase catalase activity in cerebral cortex region along with increase in GSH content and SOD in cerebellum regions. Our result suggests that the normal brain ageing is associated with the decrease in antioxidative defense status and the supplementation of thiol antioxidants like NAC may prove helpful in managing the age related brain disorders characterized by compromised antioxidative defense systems.

Keywords

N-Acetylcysteine, Reduced glutathione, Lipid peroxidation, Antioxidative defense, Brain ageing.